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- (54) Title of the invention: Set-top box with an internet bios for internet access
- (57) Abstract:

A set-top box for receiving and decoding data streams to provide video display on a display monitor (20, 22) has a unique Internet BIOS (IBIOS) adapted for providing a user interface on a connected display monitor (20, 22), providing facility for a user to access and display Web pages from the Internet World Wide Web. The IBIOS is installed in a non-volatile memory

(47) and includes a basic input output (BIOS) code set, an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application and a top managing application. The set-top box is computer based and has, in various embodiments, various capability for receiving and decoding incoming data streams and providing display from the data streams on a connected display monitor (20, 22) which may be a television set (20) or other monitor (22).

[Claims]

1. Set-top box system for video data processing, including: a central processing unit (CPU) for system management, a video graphics circuit connected to the CPU with an output for driving a display monitor, an Internet access link, an non-volatile memory connected to the CPU and having a basic input output system (BIOS) code set, a ROM DOS code set an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application, a top-managing application, characterized by that the top-managing application is adapted to provide a user interface on a connected display monitor, providing facility for a user to access and display Web pages from the Internet World Wide Web.
2. Set-top box according to the claim 1 additionally including the first decoder connected to at least one video data input stream and to the CPU and to the Video Graphics circuit.

3. Set-top box according to the claim 2 characterized by that the first decoder is a decoder/tuner connectable to one or more of a cable TV line, a satellite TV antenna and a video cassette recorder/player (VCR) and additionally including Motion Picture Experts Group (MPEG) decoder coupled to the CPU, the decoder/tuner and the video graphics circuit.
4. Set-top box according to the claim 1 characterized by that the video graphics circuit is adapted for video graphics array (VGA) output and for driving a television screen.
5. Set-top box system according to the claim 1 characterized by that the CPU is 80486 compatible microprocessor.
6. Set-top box according to the claim 2 additionally including a Smart Card reader, characterized by that the first decoder is adapted for decoding Smart Card input and providing data to the CPU.
7. Set-top box according to the claim 1 characterized by that the internet access link is one of an analog telephone data modem and an Integrated Services Digital Network (ISDN) modem.
8. Set-top box according to the claim 3 additionally including a CD-ROM drive coupled to the CPU, characterized by that the top managing application is adapted to provide a user interface on a connected display monitor, providing facility for a user to play video programs from the CD-ROM and to access and display Web pages from the Internet World Wide Web.

9. Set-top box according to the claim 1 also including a receiver/decoder for infra-red signals from a remote infra-red controller, characterized by that the user may manipulate the user interface by cursor manipulation from the infra-red controller.

10. Set-top box according to the claim 1 additionally including a hard disk drive mass storage device coupled to the CPU.

12. Set-top box system for video data processing, including: central processing unit (CPU) for system management, a video graphics circuit connected to the CPU with an output for driving a display monitor, Motion Picture Experts Group (MPEG) decoder connected to the

CPU and the video graphics circuit, for decoding data provided in MPEG format, a decoder tuner coupled to the CPU and the MPEG decoder and connectable to at least one video data input stream, at least one of an analog telephone data modem and an Integrated Services Digital Network (ISDN) modem, a compact disk read-only memory drive coupled to the CPU and

a non-volatile memory connected to the CPU with a basic input output system (BIOS) code set, an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application, a top managing application, characterized by that the top managing application is adapted to provide a user interface on a connected display monitor, providing facility for a user to play video programs

from the CD-ROM and to access and display Web pages from the Internet World Wide Web.

13. A BIOS coded in a non-volatile memory, including: a basic input output system (BIOS) code set, an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) interface code set, an embedded Web Browser application, a top-managing application, characterized by that the top-managing application is adapted for execution by a CPU to provide an interactive user interface on a display monitor the interactive user interface providing access to World Wide Web pages on the Internet.

14. A BIOS according to the claim 13 characterized by that the non-volatile memory is a Flash ROM.

15. A method for accessing and browsing the World Wide Web (WWW) on the Internet, including steps of: (a) booting a computerized set-top box from an execute-in-place (XIP) BIOS in a non-volatile memory, the set-top box with a CPU, a modem connected to a telephone line, a video graphics circuit driving a display monitor, (b) executing a managing application also XIP in the non-volatile memory, providing Internet access via modem and displaying a browser interface on the display monitor, the access software and the browser software also XIP in the non-volatile memory, (c) going to Web sites from the browser interface.

16. The method of claim 15 characterized by that the modem is an analog modem connected to analog telephone line.

17. The method according to the claim 15 characterized by that the modem is a Integrated Services Digital Network (ISDN) modem connected to and ISDN optical telephone line.

18. A method for providing World Wide Web access to users while maximizing ease of use, including steps of: (a) coding a non-volatile memory with a basic input output system (BIOS) code set, an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application, a top managing application, (b) connecting the non-volatile memory to CPU in a computerized set-top box with the CPU, a video graphics circuit with an output driving a display monitor, an Internet access link, (c) booting the computerized set-top box from the BIOS code in the non-volatile memory directly into the top managing application that establishes Internet access via the Internet access link and provides a

Browser Interface on the display monitor.

19. A method providing a CD-ROM subscription service, including steps of: (a) soliciting subscribers with a set-top box connected to a display monitor, characterized by that the set-top box includes a CD-ROM drive and Internet access code, (b) ascertaining interest categories of individual groups of subscribers, (c) perusing Internet Web sites for sites fitting the interest categories of the individual groups of subscribers, (d) coding the URLs of the Web sites of interest to the individual groups of subscribers on CD-ROM disks in a manner that, upon the disks being read in the CD-ROM drives, the Web sites are made

available to the subscribers, (e) providing the CD-ROM disks to the subscribers.

[Detailed description of the invention]

Set-Top Box With an Internet BIOS for Internet Access

Field of the invention

The present invention is in the area of multimedia device and methods and relates more particularly to integrating operating code for Internet access and browsing functions with a set-top box adapted for receiving a digital data stream from a variety of sources and providing video output from the incoming data stream.

Background of the invention

Recently, set-top boxes adapted primarily for receiving and processing typically digital data and providing signals from the received data to drive a television screen have been developed and marketed. Such boxes typically have inputs for such as a TV antenna (analog), cable TV (analog or digital), more recently direct-satellite TV (digital) and may also connect to mass storage devices such as hard disk drives and CD-ROM drives to provide capability for uploading video data from such drives and presenting the dynamic result as a display on a TV screen.

As has been true in the computer marketplace in general, the market for multi-media equipment such as set-top boxes has been characterized by a rapid pace in development of new and enhanced capabilities.

This rapid development is driven in part by rapid development of computer equipment, but has other dimensions as well. One of these other dimensions is the emergence of on-line data services and internet phenomena, such as the World Wide Web (WWW), often referred to as the «Web» that will be done as well in this specification.

The Web is a phenomenon that has been directly associated with high-end personal computers (PC). A computer platform with sufficient power and memory to operate well with Microsoft Windows and with a video monitor with color and relatively high resolution is needed for satisfactory Web access and use.

This association of Web access and use with relatively high-end personal computers has restricted Web growth (this growth has been phenomenal) to users with relatively well-developed computer skills. Very little has been done to provide web access to those who may not be inclined to own or interface with a PC directly. Also, little has been done to integrate TV reception and televisions in general with the Internet or the Web on the Internet.

What is needed is an integration of computer technology with a set-top box in a way that Web access may be provided, with display on a TV (or optionally on a connected computer video monitor) in a manner that Internet and Web access may be provided in a simplified manner for those who are not inclined to deal with high-end personal computers or to deal with the intricacies of installing software packages interfacing



with an Internet service provider or browsing with conventional browsing tools.

Difficulty with this unique concept of integrating a set-top box with a computerized device adapted for Web browsing is the threshold complexity of computers necessary to provide Web access and browsing capability. Considerable mass storage space is needed for all of the applications required to provide such functionality. For example, in a typical high-end personal computer adapted for Internet access and Web browsing, one usually has at the least the computing power of Intel equivalent 80486 central processing unit (CPU), random-access memory (RAM) capacity of at least 8 megabytes, mass storage capacity of 100 megabytes or more (typically much more) and a high resolution video graphics adapter (VGA) color monitor. Also high-speed modem is required for analog telephone access to the Internet or an Integrated Services Digital Network (ISDN) interface, where ISDN is available. Of course, in most cases the computer platform is much more sophisticated and powerful than this minimum system.

The high-capacity mass storage in a conventional Web capable computer platform is needed, among other things, for storage of all of the operating code (software) that is required. This software typically includes operating system (Windows or a similar), a version of a compatible disk operating system (DOS) code, for accessing computer peripherals, such as a hard disk drive that might be included in such a system, a Transfer Control Protocol/Internet Protocol (TCP/IP)

interface software package for Internet communication and a browser application for Internet browsing and searching. The cost of this list of applications and the mass storage space to store them is considerable.

For a set-top box to have functionality for Internet access and Web browsing, the set-top box has to have a powerful CPU, considerable mass storage space and at least the software described above. For the set-top box to have a unique user interface that does not require a user to be an experienced computer user requires even more software.

What is necessary is a set-top box with sufficient applications for Internet access and Web browsing and with the applications stored and accessed in a manner substantially less expensive than the conventional ways used with high-end computers.

Also the system needs an interactive interface that takes into account the marketplace, where most potential users are not experienced computer users. A unique system according to different embodiments of the present invention is described in detail below.

### Summary of the invention

In a preferred embodiment a set-top box system for video data processing is provided, including a central processing unit (CPU) for system management, a video graphics circuit connected to the CPU with an output for driving a display monitor, internet access link and an integrated non-volatile memory connected to the CPU and having a basic input output system (BIOS) code set, an operating system, a Transfer Control

Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application and a top-managing application. The top-managing application is adapted to provide a user interface on a connected display monitor, providing facility for a user to access and display Web pages from the Internet World Wide Web. In one embodiment the operating system includes a ROM DOS code set and a graphical user interface.

In alternative embodiments of the invention the set-top box has additional components and functionality. For example, a decoder connected to at least one video data input stream and to the CPU and to the Video Graphics circuit. The decoder may be a decoder/tuner connectable to one or more of a cable TV line, a satellite TV antenna and a video cassette recorder/player (VCR). In other embodiments there is a Motion Picture Experts Group (MPEG) decoder coupled to the CPU, the decoder/tuner and the video graphics circuit.

Preferable graphics circuit in many embodiments is a circuit conforming to the well-known Video Graphics Array (VGA), the circuit adapted for driving display monitors of several types, such as televisions and computer terminal monitors. The CPU may be any one of several well-known types or models and 80486 compatible microprocessor is preferred in many embodiments.

In an alternative embodiment system of the invention includes a Smart Card reader connected to the decoder/tuner and the decoder tuner is adapted for decoding Smart Card input and providing data to the CPU. The internet access link may be either of an

analog telephone data modem or an Integrated Services Digital Network (ISDN) modem or other type, such as a satellite link.

In yet another embodiment the system includes a CD-ROM drive coupled to the CPU and the top managing application is adapted to provide a user interface on a connected display monitor, providing facility for a user to reproduce video programs from the CD-ROM and to access and display Web pages from the Internet World Wide Web. In this and other embodiments the system includes a receiver/decoder for infra-red signals from a remote infra-red controller and the user may manipulate the user interface by cursor manipulation from the infra-red controller. Other embodiments may have other mass-storage facilities, such as a hard disk drive coupled to the CPU.

An important component of the system is a BIOS coded in a non-volatile memory, characterized the BIOS includes a basic input output system (BIOS) code set, an operating system including a ROM DOS code set, a Transfer Control Protocol/Internet Protocol (TCP/IP) interface code set, an embedded Web Browser application and a top-managing application. The top-managing application is adapted for execution by a CPU to provide the interactive user interface on a display monitor and the interactive user interface provides access to World Wide Web pages on the Internet. The internet BIOS in one embodiment is coded in a Flash ROM that allows for electronic reprogramming and diagnostics.

In another embodiment of the invention a method is provided for accessing and browsing the World Wide Web (WWW) including steps of (a) booting a computerized set-top box from an execute in place (XIP) BIOS in a non-volatile memory, the set-top box with a CPU, a modem connected to a telephone line and a video graphics circuit driving a display monitor, (b) executing a managing application XIP in the non-volatile memory, providing Internet access through the modem and displaying a browser interface on the display monitor, the access software and the browser software also XIP in the non-volatile memory, (c) going to Web sites from the browser interface.

In another embodiment a method is provided for providing World Wide Web access to user's while maximizing ease of use, including steps of (a) coding a non-volatile memory with a basic input output system (BIOS) code set, an operating system, a Transfer Control Protocol/Internet Protocol (TCP/IP) code set, an embedded Web Browser application, a top managing application, (b) connecting the non-volatile memory to a CPU in a computerized set-top box with the CPU, a video graphics circuit with an output driving a display monitor and an internet access link and (c) booting the computerized set-top box from the BIOS code in the non-volatile memory directly into the top managing application that establishes Internet access through the Internet access link and provides a Browser Interface on the display monitor.

In another embodiment a method is provided for a CD-ROM subscription service, including steps of (a) soliciting subscribers with a set-top box connected to a display monitor including a CD-ROM drive, (b) ascertaining interest categories of individual groups of subscribers, (c) perusing Internet Web sites for sites fitting the interest categories of the individual groups of subscribers, (d) coding the URLs of the Web sites of interest to the individual groups of subscribers on CD-ROM disks in a manner that, upon the disks being read in the CD-ROM drives, the URLs are displayed, (e) providing the CD-ROM disks to the subscribers.

The system of the present invention in all its different aspects and embodiments provides a unique and easy-to-use facility, especially for those persons not experienced in computer set-up and operation, to access many forms of data input for information and entertainment and to display the result in a manner familiar to such persons, while providing also for control of the system in a manner familiar to such users. Details of the invention are provided in disclosure below and the invention in various aspects is defined in the claims following the detailed descriptions.

### Brief description of the figures

Fig. 1 is a block diagram of a set-top box according to a preferred embodiment of the present invention.

Fig. 2 is a diagram of a Flash ROM according to an embodiment of the present invention, such as used in the set-top box of Fig. 1.

Fig. 3 is a figure of a top-level interactive interface provided in one embodiment of the present invention.

### Description of the preferred embodiments

Fig. 1 is a block diagram of a set-top box 11 according to a preferred embodiment of the present invention. In this box a decoder/tuner 13 receives signals from a variety of sources, such as satellite link 15, a cable TV line 17 and a VCR input 16. 80486 CPU 19 provides management and computing ability and is connected to decoder/tuner 13 by link 21. Decoder/tuner 13, besides accepting and decoding satellite signals on link 15 Cable TV signals on line 17 and VCR video signals on line 16 is connected in this embodiment to a reader 23 for Smart Cards too. Smart Cards inserted in reader 23 are read and decoded by decoder/tuner 13 that in turn provides data from the Smart Cards to CPU 19. The purpose and functions of optional Smart Card access to the set-top box is described more fully below.

In addition to the CPU and decoder/tuner, there is a Motion Picture Experts Group (MPEG) decoder 25 for interpreting data provided to the set-top box in MPEG1 and MPEG2 format and for providing signals to drive a

TV or a video monitor. MPEG is an industry standard protocol for video data and is well known in the art.

MPEG decoder 25 is connected directly to CPU 19 by link 27 and to decoder/tuner 13 by digital link 29. MPEG decoder 25 has an output line 31 to a video graphics adapter (VGA) chip or chipset 33 including video RAM (VRAM). The VGA chipset is adapted for driving a TV screen or a computer display screen via conventional circuitry. Output 20 provides TV format in any of PAL, SECAM or NTSC formats and may, in other embodiments provide other protocols as well. Output 22 provides well-known VGA output to drive a computer display monitor. In other embodiments of the invention other sorts of video circuits can be used.

For analog TV an analog antenna input 28 is provided and a direct analog line 24 goes to the video graphics circuitry.

Analog telephone modem 35 connects to a telephone line 37 and to CPU 19 providing communication with a remote location for pay TV transactions and diagnostic and downloading services. An optional ISDN interface 39 in this embodiment connects to an optical digital data cable 41 and to CPU 19 for digital telephone communication that may be used instead of or in addition to analog modem 35. Also there are optional interfaces provided for a Compact Disk Read Only Memory (CD ROM) drive 43 and a hard disk drive 45. The CD-ROM is a particularly important feature in some aspects of the present invention and MPEG formatted video data from the CD-ROM can be



provided to MPEG decoder 25 for presentation on a connected TV or display monitor.

In set-top box 11, all necessary operating code, including basic input-output system (BIOS) functions, are provided by a flash read-only memory (Flash ROM) 47, termed by the inventor the IBIOS, for Internet BIOS, connected to a relatively small dynamic RAM (DRAM), the whole connected to CPU 19. In other embodiments other sorts of non-volatile memory might be used. Further description of the IBIOS is provided below according to embodiments of the present invention.

It will be apparent to specialists in the computer arts that the communication links indicated in Fig. 1 for set-top box 11 are illustrative of data flow and are not meant to indicate the type or bandwidth of specific links. It is well known, for example, that CPU of the type described communicate on parallel buses with bus cycles controlled by bus controllers in an industry standard fashion, such as an ISA bus, an EISA bus and the like.

Fig. 2 is a diagram of 1 megabyte Flash ROM 47 according to the embodiment of the present invention. Flash ROM 47 in this embodiment includes embedded applications for all of the functionality required for set-top box 11 and is connected to 1 megabyte scratch DRAM 49. Code is execute-in-place (XIP) rather than loaded into RAM and then executed, so DRAM 49 is kept to a minimum. The purpose of DRAM 49 is temporary variable storage during execution of XIP applications.

Flash ROM 47 in the embodiment on Fig. 2 has six embedded XIP applications. In other embodiments there can be more or less such applications. A BIOS 51 of about 64 kilobytes provides Power On Self Test (POST) and other preliminary BIOS functions and boots into a Top Application 61 that provides a user interface to be described more fully below.

An embedded ROM DOS 53 provides DOS functions for system operation. Such embedded DOS compatible applications are commercially available, such as ROM-DOS 6 by Datalight Incorporated. The Datalight ROM-DOS occupies about 73 kilobytes. Interactive Graphical User Interface (GUI) 55 provides screen graphics and multitasking capability. GUI 55 occupies about 128 kilobytes. A commercially available Windows like system such as WinLight available from Datalight Incorporated is one option for the GUI. In this embodiment the ROM DOS and the GUI comprise an operating system (OS).

Top Application 61 has access to a TCP/IP interface program 57 for internet communication. Also the TCP/IP interface is embedded and XIP and program 57 occupies about 64 kilobytes. Browser 59 is provided embedded and XIP for Internet browsing operations with access to the TCP/IP interface software.

It will be apparent to specialists in the software and programming arts that there are a number of different candidates commercially available that might be incorporated into the IBIOS and that new code performing equivalent functions may be written uniquely for the IBIOS too.

### User interface and operation

Optional Smart Card reader 23 mentioned above and connected to decoder/tuner 13 provides an optional user input port for data and encryption keys for enabling functions and decoding for such as pay channels. Data and entertainment providers may make their products available by any of the several data stream inputs mentioned above, such as satellite direct TV, cable TV, CD-ROM or even ISDN link and provide smart cards to clients with decryption keys so a user may enable the purchased product. In other embodiments with or without optional Smart

Card readers, keys and other security features may be provided in other ways.

In alternative embodiment of the invention, user will subscribe to a periodic CD-ROM service for a small fee per period, such as monthly. The CD delivered each month will provide a broad range of functions and products in alternative embodiments. For example, such CD-ROM may provide an updated index of Internet sites with Universal Resource Locators (URL), an index of pay entertainment events available on one or more of the several data stream inputs in the coming month, along with access keys and may have one or more MPEG video selections on the disk too. In keeping with the purpose of providing Internet access to those who prefer not to use a computer, the CD-ROM service will do at least some browsing for the subscriber and will present the result as selectable URL to which the system may go on command.

In 1 embodiment of the present invention the CD-ROM service will be the primary and perhaps the sole data input stream. In this embodiment there will be no decoder/tuner 13 and no inputs for cable TV, satellite TV or Smart Cards.

In 1 embodiment the user interface includes an infra-red remote control box 63, of the type of the familiar remote control boxes commonly used for sending user commands to such as TV, video cassette players and the like. In this embodiment there will be an infra-red receiver/decoder 65 connected to CPU 19 for receiving infra-red coded signals from remote controller 63.

Remote control box 63 in this embodiment includes, at a minimum, a four-way pushbutton 67 for cursor control and 1 or more buttons 69 for interactive selection.

Fig. 3 is an idealized representation of a top-level interactive display 71 provided on a display monitor screen 73 by execution of Top Application 61 (Fig. 2). Screen 73 may be the screen of a television connected to set-top box 11 at the TV output from VGA circuitry 33 or other video monitor, such as a computer monitor. It will be apparent to specialists in the art that there are many sorts of display monitors that might be used, including flat screens and large, tiled displays. In some cases driving hardware may be added at the video output to drive recently developed display devices.

Interactive display 71 is similar in layout to preview screens such as provided by conventional satellite TV services and already familiar to many users, but has considerably increased functionality.

The display is provided, as indicated above, by execution of Top Application 61 that remains active in the background at all times the set-top box of the invention is in use.

User operates the system in this embodiment by using four-way pushbutton 67 (Fig. 1) to move a cursor 75 over the area of interactive display 71. By moving cursor 75 to an active area of the display and pressing an activation key, such as 1 of the buttons 69 on remote control box 63, the user can signal the system to initiate a display based on one or another of the input data streams. In other embodiments cursor control and selection may be by a pointer device connected to CPU 19 or by input from a keyboard connected to CPU 19. It will be apparent to specialists in the art that there are a variety of cursor control and selection alternatives known in the art and any one or more of such alternatives may be incorporated in alternative embodiments of the present invention. The use of an infra-red remote is compatible with the object of providing Internet Access and browsing to users not particularly computerfiendly.

In example display 71 a top line 77 provides selectability among the several data input streams that may be made available. There are, for example, selectors 79, 80, 81 and 83 in top line 77 in the embodiment shown for allowing a user to select cable TV, VCR input, CD-ROM or Satellite TV. There may, in some embodiments, be other selectors, such as for other input data streams, a hard disk drive, for example.

The body of display 71 below top line 77 is devoted to a channel - time matrix of program selections based on whichever data input stream is currently active, at least for those input data streams, like cable or satellite TV that have channels and time-based programming. For some other kinds of input data streams, such as CD-ROM, hard disk inputs or VCR input, where a user may download data that is available at any time, the display is arranged differently.

If one selects cable TV with selector 79, for example, the body of the display will provide channel numbers 93 - time, with time indicated across the top of the body of the display on line 95. In the matrix, individual programs being broadcast by channel and time are displayed. The time spread is necessarily limited to about three hours left-to-right, but may be panned in a manner described below. A user may use a scroll bar 97 or similar device to scroll the channel selections.

Date field 85 is provided in top line 77 that when the top application is first accessed, displays the current date by default. A user may use selectors 87 and 89 to move ahead in time or back to the current date. As the user moves ahead in time, the hourly time spread on line 95 changes and when the next date is reached, the date indication 85 changes.

In these examples, a user may move the cursor to any program selection provided by any one of the input data streams and select the program, whereupon the system will initiate that program, such as by jumping to the particular cable TV or satellite channel selected.

If the user selects a video, the video will immediately begin to play, but there will also be controls on the remote for stopping and restarting, moving ahead or back in the video timeline. In all cases there will remain on the display, provided by the top application, an active area that a user may select to return to the display of Fig. 3.

In the case of VCR control, a familiar interface for high-level VCR programming is displayed, as is known in the art and a user may use the cursor controls and selection keys to program a connected VCR. When a VCR tape is played, an interactive icon is displayed as well that allows a user to call up a control panel for stopping, starting, fast forward, slow motion and the like that sorts of control are well known in the art.

In some embodiments of the invention, known Pix-in-Pix and opaque overlays are provided, where a user may have display from more than one input data stream activated simultaneously. For example, one could have a program from cable TV in a window on a TV screen smaller than the principle display and a video from a CD-ROM on the principle display. The facilities for such overlays and mixed displays are well known in the art and controls may be either of dedicated buttons on the remote or selectable on-screen icons and the like.

Fig. 3 shows that there is one more and unique, selection a user may make from the top-level display 71. Selector 91, labeled Browse, activates Internet Access and Browse function in an embodiment of the present invention.

If a user selects Browse, the Top Application establishes internet access through modem 35 or ISDN link 41 (if available) and present a browser interface, as is known in the art. From this point, operation can be as is known in searching the WWW or going directly to known destinations. In this embodiment of the invention, Universal Resource Locators (URL) are transparent to the user and provided in a manner described more fully below.

In the embodiment mentioned above where a CD-ROM subscription service is used, a user will insert a CD-ROM disk that may come in the ground mail once a month or at some other period of time or in another sort of delivery service and the system will present on display 71, assuming of course that selector 83 is activated, those MPEG selections coded on the CD-ROM. In alternative embodiments, considerable further functions are provided by the CD-ROM subscription service.

In one CD-ROM service embodiment, users indicate information and entertainment preferences at the time of subscription that may be updated periodically. User may, as a simple example, indicate an interest in American History and in Spy Thriller movies. The CD-ROM for that person will then be customized by tagging all new information available in the particular data streams to which that user is connected that are in the area of interest.



With the subscribed CD-ROM disk in a connected drive, the top application uses the tags to highlight the listing of the tagged programs and destinations in the matrix of selections provided on the interactive interface. Listings in the matrix may be underlined, boxed, enhanced by color, enhanced in brightness in the display or highlighted in some other manner.

In alternative embodiments, preferences may be entered in a subscription for different family members and as indicated, the preferences can be canceled or updated periodically. In the multiple member subscriptions, there will be either or both of a facility for a family member to identify himself or highlighting will be distinguished by family member. In even more sophisticated embodiments, the top application is capable of providing a presentation to the subscriber when first activated, listing abstracts and even previews of tagged interest items.

In the case of internet destinations, the matrix display of the top application is not provided as a channel/time matrix, as for TV channels, but on an alternative matrix, such as listed by type. WWW destination types can be indexed in many ways, such as by commercial destinations, information type (genealogy/history/politics/the like), magazines, newspapers and so on. Items may be highlighted by subscription interest as well and, in some embodiments, new «hot» destinations will be highlighted. Also user may select preprogrammed tours of hot WWW destinations.

It will be apparent to specialists in the art that there are a broad variety of designs and functionality for the user interface and also a broad variety of sources of data that may be connected and included in the available selections for the user interface.

Also, it will be apparent to the specialists that there are many alterations that may be made in embodiments of the described invention without departing from the spirit and scope of the invention.

Many of these alternatives have been described above. There are many sources, for example, of data streams that may be connected and controlled to provide display on a connected display monitor.

There are similarly many alternatives for interactive interfaces, for web browser applications and the like and for organization and design of the set-top box.

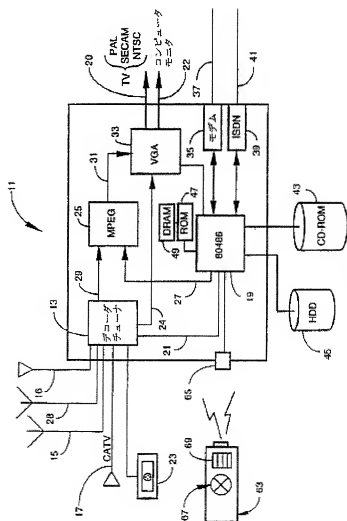
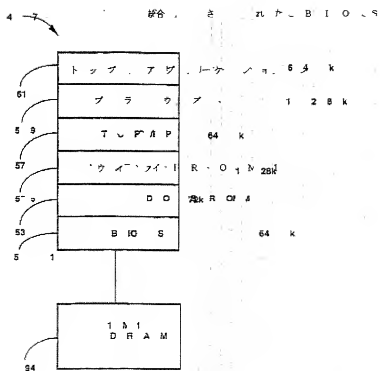


Fig. 1



F i g. 2

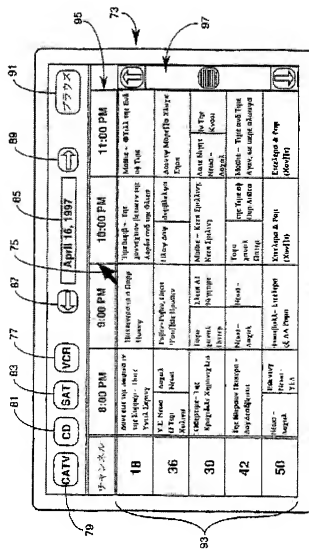


Fig. 3